Space Weather Forecast

Issued on Saturday, 15 January 2022 at 12:15 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Minor Storm intervals possible today.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Low with several C-Class flares over the past 24 hours, the most recent a C4 flare at 0854UTC this morning from the most recently numbered region rotating around the NE limb. There are seven numbered sunspot regions currently on the visible disc, of which the newly numbered region as already mentioned, is the most active at present. Two regions, located in the northwest quadrant, have shown growth but no significant flare activity. The four remaining sunspot groups, all located in the western hemisphere, are relatively small, simple groups having shown little activity this period.

No Earth-directed coronal mass ejections (CMEs) have been observed, although a CME did occur in the early afternoon UTC of the 14th, as a filament lifted-off from the southwest quadrant. The CME is expected to pass close to Earth late tomorrow or early day 3 (17th), with a slight chance of some weak CME influence occurring at Earth.

Solar Wind / Geomagnetic Activity: The solar wind speed started at slow-ambient levels, until around 14/2130UTC, then increased to slightly elevated levels, persisting at these levels thereafter. The total magnetic strength steadily increased, becoming strong, as the faster stream of solar wind arrived, then gradually returned to weak levels after midnight UTC. The important north-south component showed a similar trend, becoming strongly southward for a time as described above, before gradually returning to weakly variable levels after midnight UTC. Corresponding geomagnetic activity was initially Quiet, but increased to Active (Kp 4) between 14/1800-15/0600, with a G1/Minor Storm (Kp 5) interval 14/2100-2400 UTC (as observed by BGS). Quiet geomagnetic conditions have returned since 15/0600UTC.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) was at background with no solar radiation storms occurring.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is expected to be Low or Moderate, and further Common class or Moderate class flares are anticipated to continue from the numbered active region 2932 near the northeastern limb. Another region is also expected to rotate on from the far side, within the next two days, and this could also increase solar activity.

Solar Wind / Geomagnetic Activity: No Earth-directed CME's are currently expected, although one CME is expected to pass close to Earth late tomorrow or early on day 3 (17th). The solar wind is expected increase further through today, likely becoming strong for a time. The HSS influence is then expected to gradually decline from day 3 (17th) onwards. Occasionally Unsettled to Active (Kp 3-4) periods are likely today and through tomorrow, with isolated G1/Minor Storm intervals still possible, especially during the coming night and then to a lesser

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extend through Sunday night into day 3 (17th) due to possible weak CME influences. Geomagnetic activity is expected to decline Quiet to Unsettled (Kp 2-3) for days 3 and 4 (17th and 18th).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is forecast to remain at predominantly background levels with no solar radiation storms currently expected.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	Yes	60	40	10	1
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	30	40	40	40
Very Active	R3 to R5 X	No	2	5	5	5

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	2	2	2	2
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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